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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,799	10/30/2002	Ralph Etienne-Cummings	03940012AA	1099

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EXAMINER
MARC, MCDIEUNEL

ART UNIT	PAPER NUMBER
3661	

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

E

Office Action Summary	Application No.	Applicant(s)	
	10/009,799	ETIENNE-CUMMINGS ET AL.	
	Examiner	Art Unit	
	McDieunel Marc	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/7/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *52-54 and 65-67* is/are allowed.

6)☒ Claim(s) *1,4-8,11-14,16-23,25-27,30-34,37-40,42-48,50,51 and 55-64* is/are rejected.

7)☒ Claim(s) *2,3,10,15,24,28,29,36,41 and 49* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-67 are presented for examination allowed.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims **1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64** are rejected under 35 U.S.C. 102(e) as being anticipated by **Jacobs** (U.S. Pat. No. **6,532,400 B1**).

As per claims 1 and 27, Jacobs teaches multi-segmented robot having neurophysiological features that are similar to features found in actual biological systems which being considered as a central pattern generator-based system for controlling at least one mechanical limb (see abstract), comprising at least one mechanical limb (see fig. 5); and a non-biological central pattern generator that generates commands for controlling the at least one mechanical limb wherein commands are a function of sensory feedback (see figs. 1 and 2). With respect to claim 27, Jacobs also teaches a system having a central pattern generator-based system for controlling a biological system for rhythmic movement, comprising an interface with a biological system that can provide sensory feedback from said biological

system (see figs. 1, 2 and 5); and a non-biological central pattern generator that generates commands for controlling the biological system wherein commands are a function of sensory feedback (see abstract as noted above).

As per claims 4 and 30, Jacobs teaches a system that further including at least one memory device (see col. 1, lines 47-50), note that Jacobs recognizes the use computer for feedback and control, therefore a memory is inherent in the system.

As per claims 5 and 31, Jacobs teaches a system, wherein the memory device controls adaptation of output from the central pattern generator (see abstract and figs. 1- 2).

As per claims 6 and 32, Jacobs teaches a system, wherein the output includes integrate-and-fire neurons (see abstract), note that neurophysiological features being considered as integrated-and-fire neurons as well.

As per claims 7 and 33, Jacobs teaches a system, wherein the system is at least one chip (see col. 1, lines 47-50), note that Jacobs recognizes the use computer for feedback and control, therefore a chip is inherent in the system.

As per claims 8 and 34, Jacobs teaches a system, including at least one chip containing electronic analogues of biological neurons, synapses and time-constraints (as noted above, the use computer has been shown evidence of at least one chip that

being use for " electronic analogues of biological neurons, synapses and time-constraints" , which being considered as everyday use feature).

As per claims 11 and 37, Jacobs teaches a system, wherein the system includes at least one chip in which components are integrated with hardwired or programmable circuits (see fig. 2, element 230), the controller being considered as programmable.

As per claims 12 and 38, Jacobs teaches a system, wherein the central pattern generator is a distributed system of at least two non-linear oscillators (see fig. 5).

As per claims 13 and 39, Jacobs teaches a system, wherein the distributed system includes at least one neuron phasically coupled to a neuron or a sensory input (see figs. 1, 2 and 15A).

As per claims 14 and 40, Jacobs teaches a system, wherein the distributed system includes at least two neurons phasically coupled to each other, to another neuron, or to a sensory input (see figs. 1, 2 and 15A).

As per claims 16 and 42, Jacobs teaches a system, wherein phasic coupling is based on rhythmic movement application (see fig. 13).

As per claims 17 and 43, Jacobs teaches a system, including a phase control

circuit (see fig. 2, element 230), inherently, element 230 of figure 2 control circuit

As per claims 18 and 44, Jacobs teaches a system, including at least one integrate-and-fire spiking motoneuron driven by the phasically coupled neurons (see abstract), note that neurophysiological features being considered as integrated-and-fire spiking neurons as well.

As per claim 19 and 45, Jacobs teaches a system, including at least one muscle (see fig. 5).

As per claim 20, Jacobs teaches a system, wherein the system is a robot (see fig. 5).

As per claims 21 and 46, Jacobs teaches a system, wherein the system includes a central pattern generator chip and at least one biological neuron (see figs. 1, 2, element 230 note that the controller being taken as having chip).

As per claims 22 and 47, Jacobs teaches a system, including multiple chips (see fig. 1), inherently beside the computer noted above, the sensor and the controller contain chips.

As per claims 23 and 48, Jacobs teaches a system, including at least one sensor

for collecting sensory feedback (see fig. 1, element 240).

As per claims 25 and 50, Jacobs teaches a system, wherein the sensory feedback is received from the at least one mechanical limb (see fig. 2, element 210).

As per claims 26 and 51, Jacobs teaches a system, wherein the sensory feedback is received from a sensing modality (see fig 2, element 240), note the force vision sensor being considered as modality sensing.

As per claim 55, Jacobs teaches a system including robotics system comprising: (a) a central pattern generator-based system that mimics a biological central pattern generator (see abstract and figs. 1, 2, 5); and (b) at least one sensory device (see fig. 2, element 240).

As per claim 56, Jacobs teaches a system, wherein the central pattern generator-based system receives sensory input from the at least one sensory device (see fig. 1, element 240 as noted above).

As per claim 57, Jacobs teaches a system including an autonomous movement device for providing rhythmic control, wherein the autonomous device comprises: a non-biological central pattern generator that generates rhythmic control commands wherein commands are a function of sensory feedback (see figs 1, 2 and 5 as noted above).

As per claim 58, Jacobs teaches a system, including at least one mechanical limb (see fig. 5).

As per claim 59, Jacobs teaches a system, wherein the limb is a leg, arm, wing or appendage for swimming (see fig. 5).

As per claim 60, Jacobs teaches a system including at least two limbs (see fig. 5).

As per claim 61, Jacobs teaches a system, wherein the device is a breathing controller (see fig. 1, element 230), note that since the running is not the inventive concept, therefore the controller being considered as a breathing controller.

As per claim 62, Jacobs teaches a system, wherein the device is a pacemaker (see fig. 1, element 230), note that since the running is not the inventive concept, therefore the controller being considered as a pacemaker.

As per claim 63, Jacobs teaches a system, wherein the device is a running device (see fig. 1, element 230), note that since the running is not the inventive concept, therefore the controller being considered as a running device.

As per claim 64, Jacobs teaches a system including a non-biological central

pattern generator comprising: a memory device; and a system for manipulating neural phasic relationships (see figs. 1, 2, 5 and the abstract including the computer as noted above).

4. Claims 52-54 and 65-67 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or fairly suggest with respect to claim 52, a method for controlling a mechanical or biological system for rhythmic movement, comprising: (A) measuring sensory feedback to obtain measured sensory feedback; (B) processing the measured sensory feedback to obtain data for a plurality of designated parameters; and (C) via a central pattern generator-based system, applying a set of rules to the obtained data to generate at least one signal for commanding the limb or biological system for rhythmic movement, wherein the central pattern generator-based system comprises a circuit that mimics a biological central pattern generator. With respect to claim 65, a method for modifying a continuous waveform provided by a non-biological central pattern generator, comprising the steps of: (A) provision of a continuous waveform by a non-biological central pattern generator; (B) provision of sensory feedback to the non-biological central pattern generator; (C) rule-application by the non-biological central pattern generator to the sensory feedback; (D) based on the rule-application, determination by the non-biological central pattern generator to modify

or maintain the continuous wave form.

6. Claims 2, 3, 10, 15, 24, 28, 29, 36, 41 and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or fairly suggest with respect to claims 2 and 28, a system, including a system for phase adjustment of the central pattern generator based on a sensory trigger in or derived from sensory feedback. With respect to claims 3 and 29, a system for phase adjustment of the central pattern generator based on at least one sensory trigger in or derived from sensory-feedback; and a system for controlling firing frequency of motoneurons as a function of the sensory feedback or the sensory trigger. With respect to claims 9 and 35, a system including at least one chip that includes dynamic memories and phase modulators. With respect to claims 10 and 36, a system, wherein the system is a non-linear oscillator including electronic analogues of biological neurons, synapses and time-constraints, dynamic memories and phase modulators. With respect to claim 15 and 41, a system, wherein phasic coupling is in-phase, 180 degrees out of phase, or any number of degrees out of phase. With respect to claim 24 and 49, a system, including a system for phase adjustment of

the central pattern generator based on at least one sensory trigger in the received sensory feedback.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to McDieunel Marc whose telephone number is (703) 305-4478. The examiner can normally be reached on 6:30-5:00 Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (703) 305-8233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

McDieunel Marc

Friday, June 11, 2004

THOMAS C. BLACK
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